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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/517,261	TABATA ET AL.	
	Examiner	Art Unit	
	Joseph Saunders	2194	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *December 7, 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *December 7, 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12-7-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This is the initial office action based on the application filed on December 7, 2004. Claims 1 – 31 are currently pending and considered below.

Drawings

2. The drawings are objected to due to the following informalities:

a. Figures 19 and 20 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

b. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 6d also 6a, 6b, and 6c are not labeled in Figure 2 as suggested by the description.

c. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "13" and "31" have both been used to designate the "outer periphery portion

d. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 21 and 31.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures

appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 17 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In claim 12 the applicant states the limitation "wherein a variation of thickness of said edge in lengthwise direction is greater than a variation of thickness of said edge in widthwise direction". The applicant further states in claim 17 which depends from 12 that the "thickness of edge in lengthwise direction is greater that a thickness of said edge in widthwise direction". By removing the term "variation" from claim 17 the applicant is not further limiting claim 12 and the meaning of the two claims is the same.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 12 – 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The applicant does not describe in the specification an embodiment which details the configuration of claim 12 where the thickness of sectional shape of an inner periphery portion of said edge is thinner than a thickness of a sectional shape of an outer periphery portion of said edge while at the same time having the edge divided into a plurality of sections in a circumferential direction with convex portions and concave portions alternately arranged and a variation of thickness of said edge in lengthwise direction is greater than a variation of thickness of said edge in widthwise direction. Claims 13 – 17 depend on claim 12 and therefore also fail to meet the written description requirement.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Espiritu (US 2004/0086143 A1).

Claim 1: Espiritu discloses a loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil (Paragraph 33 and Figure 3), said voice coil being inserted into a magnetic gap of said magnetic circuit (not shown however is inherent for this type of speaker configuration in Figure 3), wherein a thickness of sectional shape of an inner periphery portion of said edge is thinner than a thickness of a sectional shape of an outer periphery portion of said edge (Paragraph 47 and Figure 8).

7. Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Saiki et al. (5,371,805).

Claim 20: Saiki discloses a loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil, said voice coil being inserted into a magnetic gap of said magnetic circuit (Column 3 Lines 55 – 68), wherein said edge is divided into a plurality of sections in a circumferential direction with convex portions and concave portions alternately arranged (Column 4 Lines 1 – 6).

8. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Sumiyama (PUB. NO. JP 06-125594 A).

Claim 21: Sumiyama discloses a loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil, said voice coil being inserted into a magnetic gap of said magnetic circuit (Paragraph 3 of Translation), wherein a size of the inner periphery of said edge is smaller than a size of the outer periphery of said diaphragm (Paragraph 2 of Translation and Drawing 3).

9. Claims 22 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Czerwinski (US 2003/0068064 A1).

Claim22: A loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil, said voice coil being inserted into a magnetic gap of said magnetic circuit (Paragraphs 39 and 40), wherein a cross section of said edge (surround) has corrugations in a radial direction (Paragraph 43 and Figure 4).

Claim 23: A loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil, said voice coil being inserted into a magnetic gap of said magnetic circuit (Paragraphs 39 and 40), wherein a plurality of rib-shaped convex portions are provided in one of a radial direction and a circumferential direction of said edge (Paragraph 41 and Figure 1 Item 30).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 2 – 5, 18, 24, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Takahashi et al. (US 2003/0002695 A1).

Claims 2 – 5, 18, and 31: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein said edge is made of one of an elastic resin and a foamed resin, wherein said foamed resin includes both of independent foam and continuous foam, wherein an expansion ratio of said foamed resin differs between the inner periphery portion and the outer periphery portion of said edge, wherein said edge is made of a foamed resin having a skin layer, and wherein said diaphragm and said edge are unitary formed and bonded to said frame. Espiritu does disclose that the surround (edge) may be made of rubber, or compressed foam rubber (Paragraph 40) and applicant discloses in his specification that rubber is also a possible material for the edge. Takahashi goes into more detail about a loudspeaker diaphragm and does explicitly discloses a loudspeaker diaphragm made of a foamed resin (Paragraph 13) and shows the edge being uniformly molded with the diaphragm (Figures 1(a) – (d)).

Takahashi further discloses wherein said foamed resin includes both of independent foam and continuous foam (Paragraph 19) and that the air permeability (expansion ratio) of the foam may be adjusted through coating or impregnating with a resin (skin layer). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu with the loudspeaker foam material of Takahashi since compared to conventional foam material the continuous foam material of low independent foam ratio allows for a high degree of flexibility in designing its shape and has good environmental resistance to heat (Paragraphs 24 – 26) while also allowing for the ability to change the air permeability of the material by coating or impregnating with a resin resulting in sufficient reproduction of high frequencies (Paragraph 22) .

Claim 24: Espiritu discloses a loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil (Paragraph 33 and Figure 3), said voice coil being inserted into a magnetic gap of said magnetic circuit (not shown however is inherent for this type of speaker configuration in Figure 3), but does not disclose wherein said diaphragm and said edge are unitary formed and bonded to said frame. Takahashi discloses a loudspeaker diaphragm and shows the edge being uniformly molded with the diaphragm (Figures 1(a) – (d)). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the loudspeaker

edge disclosed by Espiritu with the uniformly molded member of Takahashi since designing the diaphragm and edge as a uniformly molded member allow for a reduction in components which would later need to be connected therefore making it easier to manufacture.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Saiki et al. (5,371,805).

Claim 6: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein said edge is divided into a plurality of sections in a circumferential direction with convex portions and concave portions alternately arranged. Saiki discloses a loudspeaker of similar configuration where the edge is divided into alternately arranged convexly rolled and concavely rolled pieces (Column 4 Lines 1 – 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Saiki since "secondary harmonic distortion of sound pressure characteristics, which is caused by the differences between quantities of air displaced by the edge member in the forward and rearward vibrations of the diaphragm, can be greatly reduced" (Column 2 Lines 39 – 44).

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Sumiyama (PUB. NO. JP 06-125594 A).

Claim 7: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein a size of the inner periphery of said edge is smaller than a size of the outer periphery of said diaphragm. Sumiyama discloses a loudspeaker of similar configuration where the outer diameter of the diaphragm is larger than the clamp section of the edge (Drawing 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Sumiyama since it allows for the diameter to be enlarged which increases low frequency reproduction while maintaining a small enclosure size (Paragraph 2 of Translation).

14. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Czerwinski (US 2003/0068064 A1).

Claim 8: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein a cross section of said edge has corrugations in a radial direction. Czerwinski discloses a loudspeaker of similar configuration where the cross section of the surround (edge) includes corrugations in the radial direction (Figure 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Czerwinski since it allows for the diaphragm to be centered while providing a restoring force to keep the voice coil positioned within the magnetic gap (Paragraph 43).

Claim 10: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein a plurality of rib-shaped convex portions are provided in a circumferential direction of said edge. Czerwinski discloses a loudspeaker of similar configuration where the surround (edge) includes a relatively less-compressed area in the circumferential direction of the edge (Paragraph 41 and Figure 1 Item 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Czerwinski since it allows for "increased flexibility in a direction which is orthogonal to the diaphragm without losing any rigidity in any direction within the plane of the diaphragm" (Paragraph 44).

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Irby et al. (US 6,611,604 B1).

Claim 9: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein a plurality of rib-shaped convex portions are provided in a radial direction of said edge. Irby discloses a loudspeaker of similar configuration where the surround (edge) has radially position ribs (Item 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Irby since the ribs allow for better performance in

the form of less distortion due to an increased rigidity of the surround (Column 2 Lines 55 – 64).

16. Claims 11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Kura et al. (PUB. NO. JP 05-122791 A).

Claim 11: Espiritu discloses the loudspeaker of claim 1, but does not disclose wherein said loudspeaker has a long shape, and wherein a thickness of said edge in lengthwise direction is greater than a thickness of said edge in widthwise direction. Kura discloses a loudspeaker of similar configuration where the edge is divided sections in the circumferential direction where the thickness of the material used for the edge changes (Paragraphs 7 – 9 of Translation). Neither Espiritu nor Kura illustrate the speaker as being of a long shape however Espiritu does disclose that the loudspeaker surround could be for any shape speaker including oval or rectangular (Paragraph 41) further applicant has disclosed in his background that a long shaped loudspeaker is conventional. It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Kura in a long shaped loudspeaker since the edge sections of varying thickness may be spaced in any manner along the edge to allow for sufficient supporting of the diaphragm where the edge is "thick" while allowing for sufficient mobility of the diaphragm in the section where the edge is "thin" (Paragraph 11 of Translation).

Claim 19: Espiritu discloses a loudspeaker comprising: at least a magnetic circuit; a frame connected to said magnetic circuit; and a diaphragm connected to a voice coil, an outer periphery of said diaphragm being bonded to said frame via an edge, and an inner periphery of said diaphragm being bonded to said voice coil (Paragraph 33 and Figure 3), said voice coil being inserted into a magnetic gap of said magnetic circuit (not shown however is inherent for this type of speaker configuration in Figure 3), but does not disclose wherein said loudspeaker has a long shape, and wherein a thickness of said edge in lengthwise direction is greater than a thickness of said edge in widthwise direction. Kura discloses a loudspeaker of similar configuration where the edge is divided sections in the circumferential direction where the thickness of the material used for the edge changes (Paragraphs 7 – 9 of Translation). Neither Espiritu nor Kura illustrate the speaker as being of a long shape however Espiritu does disclose that the loudspeaker surround could be for any shape speaker including oval or rectangular (Paragraph 41) further applicant has disclosed in his background that a long shaped loudspeaker is conventional. It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Kura in a long shaped loudspeaker since the edge sections of varying thickness may be spaced in any manner along the edge to allow for sufficient supporting of the diaphragm where the edge is "thick" while allowing for sufficient mobility of the diaphragm in the section where the edge is "thin" (Paragraph 11 of Translation).

17. Claims 12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Saiki et al. (5,371,805) as applied to claim 6 above, and further in view of Kura et al. (PUB. NO. JP 05-122791 A).

Claim 12 and 17: Espiritu and Saiki disclose the loudspeaker of claim 6, but do not disclose wherein said loudspeaker has a long and slim shape, and wherein a variation of thickness of said edge in lengthwise direction is greater than a variation of thickness of said edge in widthwise direction. Kura discloses a loudspeaker of similar configuration where the edge is divided sections in the circumferential direction where the thickness of the material used for the edge changes (Paragraphs 7 – 9 of Translation). Neither Espiritu and Saiki nor Kura illustrate the speaker as being of a long shape however Espiritu does disclose that the loudspeaker surround could be for any shape speaker including oval or rectangular (Paragraph 41) further applicant has disclosed in his background that a long shaped loudspeaker is conventional. It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu and Saiki incorporating the feature disclosed by Kura in a long shaped loudspeaker since the edge sections of varying thickness may be spaced in any manner along the edge to allow for sufficient supporting of the diaphragm where the edge is "thick" while allowing for sufficient mobility of the diaphragm in the section where the edge is "thin" (Paragraph 11 of Translation).

18. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1), Saiki et al. (5,371,805), and Kura et al. (PUB. NO. JP 05-122791 A) as applied to claims 12 and 17 above, and further in view of Sumiyama (PUB. NO. JP 06-125594 A).

Claim 13: Espiritu, Saiki, and Kura disclose the loudspeaker of claim 12, but do not disclose wherein a size of an inner periphery of said edge is smaller than a size of an outer periphery of said diaphragm. Sumiyama discloses a loudspeaker of similar configuration where the outer diameter of the diaphragm is larger than the clamp section of the edge (Drawing 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu, Saiki, and Kura incorporating the feature disclosed by Sumiyama since it allows for the diameter to be enlarged which increases low frequency reproduction while maintaining a small enclosure size (Paragraph 2 of Translation).

19. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1), Saiki et al. (5,371,805), and Kura et al. (PUB. NO. JP 05-122791 A) as applied to claims 12 and 17 above, and further in view of Czerwinski (US 2003/0068064 A1).

Claim 14: Espiritu, Saiki, and Kura disclose the loudspeaker of claim 12, but do not disclose wherein a cross section of said edge has corrugation in a radial direction. Czerwinski discloses a loudspeaker of similar configuration where the cross section of the surround (edge) includes corrugations in the radial direction (Figure 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu, Saiki, and Kura incorporating the feature disclosed by Czerwinski since it allows for the diaphragm to be centered while providing a restoring force to keep the voice coil positioned within the magnetic gap (Paragraph 43).

Claim 16: Espiritu, Saiki, and Kura disclose the loudspeaker of claim 12, but do not disclose wherein a plurality of rib-shaped convex portions are provided in a circumferential direction of said edge. Czerwinski discloses a loudspeaker of similar configuration where the surround (edge) includes a relatively less-compressed area in the circumferential direction of the edge (Paragraph 41 and Figure 1 Item 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Czerwinski since it allows for "increased flexibility in a direction which is orthogonal to the diaphragm without losing any rigidity in any direction within the plane of the diaphragm" (Paragraph 44).

20. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1), Saiki et al. (5,371,805), and Kura et al. (PUB. NO. JP 05-122791 A) as applied to claims 12 and 17 above, and further in view of Irby et al. (US 6,611,604 B1).

Claim 15: Espiritu, Saiki, and Kura disclose the loudspeaker of claim 12, but do not disclose wherein a plurality of rib-shaped convex portions are provided in a radial direction of said edge. Irby discloses a loudspeaker of similar configuration where the surround (edge) has radially position ribs (Item 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu incorporating the feature disclosed by Irby since the ribs allow for better performance in the form of less distortion due to an increased rigidity of the surround (Column 2 Lines 55 – 64).

21. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Takahashi et al. (US 2003/0002695 A1) as applied to claims 2 – 5, 18, 24, and 31 above, and further in view of Saiki et al. (5,371,805).

Claim 25: Espiritu and Takahashi disclose the loudspeaker of claim 1, but do not disclose wherein said edge is divided into a plurality of sections in a circumferential direction with convex portions and concave portions alternately arranged. Saiki discloses a loudspeaker of similar configuration where the edge is divided into

alternately arranged convexly rolled and concavely rolled pieces (Column 4 Lines 1 – 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu and Takahashi incorporating the feature disclosed by Saiki since "secondary harmonic distortion of sound pressure characteristics, which is caused by the differences between quantities of air displaced by the edge member in the forward and rearward vibrations of the diaphragm, can be greatly reduced" (Column 2 Lines 39 – 44).

22. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Takahashi et al. (US 2003/0002695 A1) as applied to claims 2 – 5, 18, 24, and 31 above, and further in view of Sumiyama (PUB. NO. JP 06-125594 A).

Claim 26: Espiritu and Takahashi disclose the loudspeaker of claim 2, but do not disclose wherein a size of the inner periphery of said edge is smaller than a size of the outer periphery of said diaphragm. Sumiyama discloses a loudspeaker of similar configuration where the outer diameter of the diaphragm is larger than the clamp section of the edge (Drawing 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu and Takahashi incorporating the feature disclosed by Sumiyama since it allows for the diameter to be enlarged which increases low frequency reproduction while maintaining a small enclosure size (Paragraph 2 of Translation).

23. Claims 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Takahashi et al. (US 2003/0002695 A1) as applied to claims 2 – 5, 18, 24, and 31 above, and further in view of Czerwinski (US 2003/0068064 A1).

Claim 27: Espiritu and Takahashi disclose the loudspeaker of claim 2, but do not disclose wherein a cross section of said edge has corrugations in a radial direction. Czerwinski discloses a loudspeaker of similar configuration where the cross section of the surround (edge) includes corrugations in the radial direction (Figure 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu and Takahashi incorporating the feature disclosed by Czerwinski since it allows for the diaphragm to be centered while providing a restoring force to keep the voice coil positioned within the magnetic gap (Paragraph 43).

Claim 29: Espiritu and Takahashi disclose the loudspeaker of claim 2, but do not disclose wherein a plurality of rib-shaped convex portions are provided in a circumferential direction of said edge. Czerwinski discloses a loudspeaker of similar configuration where the surround (edge) includes a relatively less-compressed area in the circumferential direction of the edge (Paragraph 41 and Figure 1 Item 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to

construct the loudspeaker edge disclosed by Espiritu and Takahashi incorporating the feature disclosed by Czerwinski since it allows for "increased flexibility in a direction which is orthogonal to the diaphragm without losing any rigidity in any direction within the plane of the diaphragm" (Paragraph 44).

24. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Takahashi et al. (US 2003/0002695 A1) as applied to claims 2 – 5, 18, 24, and 31 above, and further in view of Irby et al. (US 6,611,604 B1).

Claim 28: Espiritu and Takahashi disclose the loudspeaker of claim 2, but do not disclose wherein a plurality of rib-shaped convex portions are provided in a radial direction of said edge. Irby discloses a loudspeaker of similar configuration where the surround (edge) has radially position ribs (Item 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu and Takahashi incorporating the feature disclosed by Irby since the ribs allow for better performance in the form of less distortion due to an increased rigidity of the surround (Column 2 Lines 55 – 64).

25. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Espiritu (US 2004/0086143 A1) in view of Takahashi et al. (US 2003/0002695 A1) as applied to claims 2 – 5, 18, 24, and 31 above, and further in view of Kura et al. (PUB. NO. JP 05-122791 A).

Claim 30: Espiritu and Takahashi disclose the loudspeaker of claim 2, but do not disclose wherein said loudspeaker has a long shape, and wherein a thickness of said edge in lengthwise direction is greater than a thickness of said edge in widthwise direction. Kura discloses a loudspeaker of similar configuration where the edge is divided sections in the circumferential direction where the thickness of the material used for the edge changes (Paragraphs 7 – 9 of Translation). Neither Espiritu nor Kura illustrate the speaker as being of a long shape however Espiritu does disclose that the loudspeaker surround could be for any shape speaker including oval or rectangular (Paragraph 41) further applicant has disclosed in his background that a long shaped loudspeaker is conventional. It would have been obvious to one of ordinary skill in the art at the time of the invention to construct the loudspeaker edge disclosed by Espiritu and Takahashi incorporating the feature disclosed by Kura in a long shaped loudspeaker since the edge sections of varying thickness may be spaced in any manner along the edge to allow for sufficient supporting of the diaphragm where the edge is "thick" while allowing for sufficient mobility of the diaphragm in the section where the edge is "thin" (Paragraph 11 of Translation).

Conclusion

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Iwasa et al. (US 2001/0011615 A1) discloses a loudspeaker where the edge is made of a foamed rubber material having a thickness that changes between the outer peripheral and inner peripheral edges. The edge material has a surface layer that is dense and a coarse lightweight interior. The variation in foam magnification allows for the weight and stiffness of the edge to be adjusted. The edge is also shown to have a cross section with corrugations in the radial direction.

b. Kuze et al. (US 6,700,987 B2) discloses a loudspeaker where the thickness of the edge is increased in the form of protrusions that may also take the shape of circumferential ribs or have other alternate arrangements so as to disperse undesirable resonance in the edge.

c. Leach et al. (US 6,171,534 B1) discloses a loudspeaker surround that decreases in thickness from the outer peripheral edge to the inner peripheral edge. Also, the surround and the cone may be molecularly bonded when during the molding process.

d. Honda et al. (PUB. NO. JP 10-126881) shows a rectangular speaker where the thickness of the diaphragm material on the short side is thicker than the diaphragm material on the long side in order to balance the mass of the diaphragm so that harmonic distortion is refrained.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Saunders whose telephone number is (571) 270-1063. The examiner can normally be reached on Monday - Thursday, 9:00 a.m. - 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Myhre can be reached on (571) 270-1065. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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